

Journal of Catalysis

EDITORS:

W. Keith Hall

Frank S. Stone

EDITORIAL BOARD:

R. B. Anderson

M. Boudart

J. B. Butt

A. Cimino

R. P. Eischens

P. C. Gravelle

J. Haber

C. Kemball

G. W. Keulks

J. H. Lunsford

A. Nielsen

J. F. Roth

W. M. H. Sachtler

G. C. A. Schuit

P. W. Selwood

G. V. Smith

Z. G. Szabó

K. Tamaru

S. J. Thomson

P. B. Weisz

Volume 60 • 1979



ACADEMIC PRESS

New York and London

A Subsidiary of Harcourt Brace Jovanovich, Publishers

Copyright © 1979 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated, per copy fee through the Copyright Clearance Center, Inc. (Operations Staff, P.O. Box 765, Schenectady, New York 12301), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1979 articles are the same as those shown for current articles.

MADE IN THE UNITED STATES OF AMERICA

Contents of Volume 60

NUMBER 1, OCTOBER 30, 1979

YU. V. BELOKOPYTOV, K. M. KHOLYAVENKO, AND S. V. GEREL. An Infrared Study of the Surface Properties of Metal Oxides. 2. The Interaction of Ammonia with the Surface of Fe_2O_3 , ZnO , MoO_3 , and V_2O_5	1
I. V. KRYLOVA, N. I. KONYUSHKINA, I. A. RODINA, AND V. I. SVITOV. Exoelectron Emission Accompanying Catalytic Reactions in Adsorbed Layers.....	8
M. J. LEDOUX AND F. G. GAULT. Correlation between Surface Structure and Reaction Mechanisms: Reactions of Olefins on Nickel and Palladium Films.....	15
S. D. SANSARE, V. R. CHOUDHARY, AND L. K. DORAISWAMY. Some Unusual Observations Concerning the Adsorption of Thiophene on Copper Chromite.....	21
JOHN F. KNIFFTON. Syngas Reactions I. The Catalytic Carbonylation of Conjugated Dienes.....	27
D. R. OLANDER AND M. BALOOCH. Platinum-Catalyzed Gasification of Graphite by Hydrogen.....	41
N. M. GUPTA, V. S. KAMBLE, K. ANNAJI RAO, AND R. M. IYER. On the Mechanism of CO and CO_2 Methanation over Ru/Molecular-Sieve Catalyst.....	57
FREDERICK J. KAROL, CHISUNG WU, WALTER T. REICHLE, AND NORMA J. MARASCHIN. Role of Silanol Groups in Formation of Supported Chromocene Catalysts.....	68
A. CORMA AND B. W. WOJCIECHOWSKI. A Comparison of HY and LaY Cracking Activity in Cumene Dealkylation.....	77
LASZLO GUCZI, RENE B. LAPIERRE, ALVIN H. WEISS, AND EHUD BIRON. Acetylene Deuteration in the Presence of $[\text{C}^{14}]$ Ethylene.....	83
P. A. ZHDAN, G. K. BORESKOV, A. I. BORONIN, A. P. SCHEPELIN, W. F. EGELHOFF, JR., AND W. H. WEINBERG. Nitric Oxide Adsorption and Decomposition on the (111) and (110) Surfaces of Iridium.....	93
F. J. KUIJERS AND V. PONEC. The Surface Composition of Pd-Ag Alloys.....	100
TH. M. WORTEL, D. OUDIJN, C. J. VLEUGEL, D. P. ROELOFSEN, AND H. VAN BEKKUM. Selective Bromination of Halobenzenes Using Zeolite Catalysts.....	110
L. GUCZI, K. MATUSEK, AND M. ESZIERLE. Preparation, Characterization, and Catalytic Activity of Silica-Supported Highly Dispersed Pt-Fe Catalysts.....	121
I. SURJO AND E. CHRISTOFFEL. Kinetics of Simultaneous Isomerization and Cracking of <i>n</i> -Hexane over $\text{Pt}/\text{Al}_2\text{O}_3$	133
IKAI WANG, TSUI-JUNG CHEN, KUEI-JUNG CHAO, AND TSENG-CHANG TSAI. The Comparison of Cracking Activity, Product Selectivity, and Steam Stability of ZSM-5 to Other Cracking Catalysts.....	140
D. G. HOLAH, I. M. HOODLESS, A. N. HUGHES, AND L. SEDOR. Kinetics of Liquid-Phase Hydrogenation of 1-Alkenes over a Partially Hydrogenated Nickel Boride and the Effect of Catalyst Poisons upon These Hydrogenations.....	148
MARK R. S. MANTON AND JOHN DAVIDTZ. Controlled Pore Sizes and Active Site Spacings Determining Selectivity in Amorphous Silica-Alumina Catalysts.....	156
LETTERS TO THE EDITORS.....	167

S. A. BEST, R. G. SQUIRES, AND R. A. WALTON. The X-Ray Photoelectron Spectra of Heterogeneous Catalysts. III. Catalysts Derived from Dimeric Molybdenum(II) Carboxylates on Silica and Their Reactions with Carbon Monoxide, Nitric Oxide, and Hydrogen.....	171
GERARD V. SMITH AND MARIAN MUSOIU. Asymmetric Hydrogenations over Modified Raney Nickel.....	184
R. MAGGIORE, N. GIORDANO, C. CRISAFULLI, F. CASTELLI, L. SOLARINO, AND J. C. J. BART. The Mechanism of Dehydrogenation of Cyclohexane on $\text{MoO}_3/\text{Al}_2\text{O}_3$ Catalysts.....	193
MINORU UCHIDA, AND ALEXIS T. BELL. A Study of NO Reduction by H_2 over an Alumina-Supported Ruthenium Catalyst.....	204
JEAN-PIERRE JOLY AND DAVID OLLIS. Conversions of Isopropanol by Processed Coal Minerals and Pyrite.....	216
KOSAKU KISHI, KEIKO CHINOMI, YOSHIHIDE INOUE, AND SHIGERO IKEDA. X-Ray Photoelectron Spectroscopic Study of the Adsorption of Benzene, Pyridine, Aniline, and Nitrobenzene on Evaporated Nickel and Iron.....	228
AYSE ERDEM AND L. B. SAND. Crystallization and Metastable Phase Transformations of Zeolite ZSM-5 in the $(\text{TPA})_2\text{O}-\text{Na}_2\text{O}-\text{K}_2\text{O}-\text{Al}_2\text{O}_3-\text{SiO}_2-\text{H}_2\text{O}$ System...	241
C. H. BARTHOLOMEW, G. D. WEATHERBEE, AND G. A. JARVI. Sulfur Poisoning of Nickel Methanation Catalysts. I. <i>In Situ</i> Deactivation by H_2S of Nickel and Nickel Bimetallics.....	257
J. LAHAYE AND R. LAGARDE. Platinum and Palladium on Silica Produced by Impregnation from Tetrakis(Triphenylphosphine) Complexes.....	270
C. P. CHENG AND G. L. SCHRADER. Characterization of Supported Molybdate Catalysts during Preparation Using Laser Raman Spectroscopy.....	276
A. OMAR, G. DJEGA-MARIADASSOU, AND F. BOZON-VERDURAZ. Chemical State and Reactivity of Supported Palladium. II. Support Effect and Catalyst Activation by the Reaction Mixture in Ethylene Oxidation.....	295
MAMORU AI. The Relationship between the Oxidation Activity and the Acid-Base Properties of Fe_2O_3 -Based Mixed Oxides. II. The $\text{Fe}_2\text{O}_3-\text{P}_2\text{O}_5$, $\text{Fe}_2\text{O}_3-\text{K}_2\text{O}$, and $\text{Fe}_2\text{O}_3-\text{Bi}_2\text{O}_3-\text{P}_2\text{O}_5$ Systems.....	306
W. HOFFMANN, E. BERTEL, AND F. P. NETZER. Surface Chemistry of Cyanogen on Pt(111): Isotopic Exchange and Coadsorption with CO.....	316
J. A. DALMON. Study of Well-Defined Silica-Supported Nickel-Copper Catalysts....	325
NOTES	
ANDREW K. GALWEY AND MICHAEL E. BROWN. Compensation Parameters in Heterogeneous Catalysis.....	325
C. JOSEPH MACHIELS AND ROBERT B. ANDERSON. Hydrogenolysis of Isopentane in Nickel.....	339
JO TASHIRO, ISAO TAKAKUWA, SHIN-YA YOKOYAMA, AND HIRONORI HANEDA. Remarkable Effects of Supporting Oxides for Complete Oxidation of Styrene.....	341
BOOK REVIEW.....	343
ERRATUM.....	344

NUMBER 3, DECEMBER 1979

G. A. MARTIN. The Kinetics of the Catalytic Hydrogenolysis of Ethane over Ni/SiO ₂	345
M. CHEN, T. WANG, AND L. D. SCHMIDT. Morphology of Pt-Rh Alloy Crystallites on Amorphous SiO ₂	356
J. M. HERRMANN, J. DISIDER, M.-N. MOZZANEGA, AND P. PICHAT. Heterogeneous Photocatalysis: <i>In Situ</i> Photoconductivity Study of TiO ₂ during Oxidation of Isobutane into Acetone.....	369
R. P. H. GASSER AND G. J. PERRY. Oxygen Isotope Reactions on Platinum.....	378
A. F. CARLEY, S. RASSIAS, M. W. ROBERTS, AND WANG TANG-HAN. A Study of the Interaction of Nitric Oxide with Nickel and Oxidized Nickel Surfaces by X-Ray Photoelectron Spectroscopy.....	385
G. L. OTT, T. FLEISCH, AND W. N. DELGASS. Fischer-Tropsch Synthesis over Freshly Reduced Iron-Ruthenium Alloys.....	394
W. S. MILLMAN, M. CRESPIN, A. C. CIRILLO, JR., S. ABDO, AND W. KEITH HALL. Studies of the Hydrogen Held by Solids. XXII. The Surface Chemistry of Reduced Molybdena-Alumina Catalysts.....	404
MICHEL DEEBA AND W. KEITH HALL. The Measurement of Catalyst Acidity. I. Titration Measurements.....	417
J. A. BUSBY AND D. L. TRIMM. Initial Activation of Platinum-Rhodium Gauzes for the Catalytic Oxidation of Ammonia.....	430
DAVID H. S. YING AND ROBERT J. MADIX. Thermal Desorption Study of the Acetic Acid Decomposition on Clean Ni/Cu(110) Alloy Surfaces.....	441
G. A. MARTIN. Influence of the Surface Structure on the Kinetics of Ethane Hydrogenolysis over Ni/SiO ₂ Catalysts.....	452
R. LEAUTE AND I. G. DALLA LANA. Combined Differential and Integral Kinetic Modeling in an Infrared Cell-Recycle Reactor.....	460

NOTES

PAOLO BELTRAME, ITALO FERINO, LUCIO FORNI, AND SERGIO TORRAZZA. Activity of Various Supported Rh Catalysts for Toluene Steam Dealkylation.....	472
D. L. TRIMM, J. CORRIE, AND W. LAM. Heterogeneous-Homogeneous Effects during the Catalytic Oxidation of Butene.....	476

LETTERS TO THE EDITORS

G. HENRICI-OLIVÉ AND S. OLIVÉ. In Re: Fischer-Tropsch. Comments to Notes by R. B. Anderson (1) and R. J. Madon (2).....	481
R. B. ANDERSON. Reply to the Rebuttal by G. Henrici-Olivé and S. Olivé.....	484
R. J. MADON. Reply to Comments by G. Henrici-Olivé and S. Olivé.....	485
AUTHOR INDEX FOR VOLUME 60.....	487
CUMULATIVE AUTHOR INDEX FOR VOLUMES 56-60.....	489
CUMULATIVE SUBJECT INDEX FOR VOLUMES 56-60.....	494



Digitized by the Internet Archive
in 2026

**Scientific and Technical
publications of**

**Dowden,
Hutchinson,
& Ross, Inc.**

**now distributed exclusively
and worldwide by**

Academic Press, Inc.

BENCHMARK BOOKS® PUBLISHING PROGRAM

These volumes make accessible to the individual scientist and researcher, as well as to libraries the key papers in many basic areas of scientific research, forming the very core of any science library. The papers contained in each Benchmark volume are selected by experts for contemporary impact, historical significance, and scientific elegance. Each series will contain from twelve to forty or more volumes of classic and recent papers representing the landmark developments within the particular subject area of the series.

INDIVIDUAL SERIES COVER THE FOLLOWING AREAS:

Animal Behavior
Biological Concepts
Ecology
Genetics
Human Physiology
Microbiology
Systematic and Evolutionary Biology
Geology
Analytical Chemistry
Inorganic Chemistry
Organic Chemistry
Polymer Chemistry
Acoustics
Nuclear Physics
Energy
Optics
Electrical Engineering and Computer Science

A complete list of volumes in each series—as well as other publications of Dowden, Hutchinson & Ross, Inc.—is available from the Academic Press Sales Department.

Write for your copy today!

Academic Press, Inc.

AP 7835

A Subsidiary of Harcourt Brace Jovanovich, Publishers

111 FIFTH AVENUE, NEW YORK, N.Y. 10003
24-28 OVAL ROAD, LONDON NW1 7DX

"... adds considerably to the literature in series."

—NATURE

ADVANCES IN HETEROCYCLIC CHEMISTRY

Edited by ALAN R. KATRITZKY and A. J. BOULTON

This series provides a thorough analysis and review of the extensive work underway in heterocyclic chemistry. Researchers in the fields of organic chemistry, chemical and industrial engineering, and students in chemistry and engineering, will find that the articles in this authoritative series treat, extensively, progress in the field of heterocyclic chemistry. The bibliographic references accompanying each article act as a pathway to the literature of heterocyclic chemistry.

"... an excellent work ... can be whole-heartedly recommended for students and research workers in the field of organic chemistry ... many will look forward keenly to subsequent volumes in this important area."

—SCIENCE

"... thorough and authoritative and will be very useful."

—JOURNAL OF THE AMERICAN CHEMICAL SOCIETY

"The latest two volumes of this ... publication fully maintain the standards established during the past four years, with a selection of timely reviews on both general and specialist aspects of the subject. No one ... can fail to find interest in at least some of the material, while to the research worker active in heterocyclic chemistry this series must be an important part of his library."

—NATURE

Complete information on each volume in the series is available on request.

Take advantage of the convenience of our Continuation Order Plan:

Your CONTINUATION ORDER authorizes us to ship and bill each volume automatically, immediately upon publication. This order will remain in effect until cancelled. Please specify volume number with which your order is to begin. Please direct all inquiries and orders to the Sales Department.

AP 7408

ACADEMIC PRESS

A Subsidiary of Harcourt Brace Jovanovich, Publishers

111 FIFTH AVENUE, NEW YORK, N.Y. 10003

24-28 OVAL ROAD, LONDON NW1 7DX